

degree of structural variability that I came on was also in that northern area; Transbaikalia, Yablonoi Mountains, etc. In the Altai and to the south, though transitional specimens occur, others typical of *malvae* are not rare, and the same applies to the Tian Shan.

Alberti notes that Evans overlooked this Asiatic race in his Catalogue (Evans, 1949), but this is not surprising considering his disregard of anatomical character in cases where certain races were supposed not to occur on common ground. This inconclusive supposition entails the further unsound assumption that races in proximity, which have not actually been seen to fly together, do not and have not, done so. Any collector who is old enough to have revisited a locality with which he was formerly familiar after a lapse of twenty years or so, will know the extent to which any wild district can change even in this short time (without the aid of man), and the distance which a colony of insects can have moved from their former ground. Two races now known in proximity must probably have changed their habitats at various times during the past few hundred years, during which movements they can scarcely have avoided traversing the same ground. Proximity therefore implies the capacity to exist together.

The subsp. *asiaeclara* which gives us what is probably the most perfect example known of the evolution of one living race from another, is worthy of fuller recognition than it has been given. Unfortunately oversights have led to three names being given to it, and consequent uncertainty has obscured it. But unlike what so often happens in such cases, the valid name is unquestionably the most appropriate.

Verity's choice points both to the insect being confined to Asia, and its wide distribution, it was fortunate he did not link it to any one mountain range. My own *coreanus*, while indicating the area where it attains greatest structural constancy, tends to obscure the vital factor of its spread westwards across the entire width of Asia. Alberti's selection, a tribute to a friend, in no way marks the great scientific interest that attaches to this race.

It is to be hoped that as subsp. *asiaeclara* Vty. it will become more universally recognized.

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Butterflies of New Providence Island, Bahamas

By B. K. WEST

In 1900 a short account, written by Emily E. Sharpe, appeared in the Proceedings of the Zoological Society of London, concerning the butter-

flies captured on New Providence Island by J. L. Bonhote, and was stated by the writer to be the first on the butterflies of the Bahamas. I believe nothing on this subject has been written subsequently in British entomological journals, although a number of interesting and informative papers have been published in the U.S.A., including the results of an expedition by the Van Voast-American Museum of Natural History which collected throughout the Bahama Islands from December 1952 to May 1953.

This collection of J. L. Bonhote comprises a large part of the Bahamian material in the British Museum, and incidentally the most valuable part by virtue of all his specimens being adequately labelled. Many of the specimens contributed by other collectors are either undated or are labelled simply 'Bahamas'. As this account concerns the butterflies of N.P.I. only, I have ignored records and specimens not specifically of that island. Thus the British Museum collection contains a specimen of *Vanessa virginiensis* Drury, seven of *Eumaeus atala* Poey and one of *Strymon limeniu* Hew., all labelled 'Bahamas,' which might or might not have been caught on N.P.I. Incidentally, I believe *V. virginiensis* and *S. limenia* have not otherwise been recorded from the Bahama Islands.

New Providence Island occupies a central position in the Bahamas which are scattered to the North and to the South of the Tropic of Cancer for a distance of some three hundred miles in each direction. In the North the Bimini Islands lie but fifty miles from the coast of Florida, and Grand Bahama Island not much further from the North American continent; in the South, Great Inagua is a similar distance from both Cuba and Haiti.

New Providence Island is twenty-one miles long and seven miles wide, in the main flat, and is composed of limestone. There is a wide variety of habitats, however—fine gardens, bush and scrub, woodland, fields of grass and flowers, mangrove swamps and flowery roadsides. Butterflies and diurnal moths are very much in evidence, even in Nassau where numerous flowers, including enormous masses of brightly coloured Bougainvillea, are an attraction to the common *Papilio andraemon* Hübn., the large yellow *Poebis sennae* L. and orange *P. agarithe* Boisd. (in flight, habits and appearance similar to the Old World *Catopsilia*) and skippers. Lantana bushes provide a special attraction to Hesperids, while a small, white flowered Composite weed, *Bidens pilosa* L. is favoured by the Satyrid *Calisto herophile* Hübn. and some of the *Strymon* group of Lycaenids (and though it is so easy to capture specimens feeding at these flowers, one's net is quickly entangled with the small barbed seeds which must immediately be laboriously removed before further use of the net!). By the shore the sweet smelling flowers of the Seven Year Apple, *Casasia clusiaefolia* Urban are sought by *Papilio polydamus* L., *Kricogonia lyside* Lat. and at dusk by hawk moths. In fields and by waysides two blue flowered plants commonly seen are *Commelina elegans* H.B.K. (Comelinaceae) and *Stachytarpheta jamaicensis* Vahl (Verbenaceae), and both these are a great attraction to many kinds of skippers and the diurnal hawk moth *Aellopus tantalus* L. In general, where there is an abundance of flowers, butterflies abound, but they are virtually absent from pine barrens and palmetto scrub.

From April 1945 until April 1946 I was residing at the R.A.F. airfield on the outskirts of Nassau, and among the butterflies I caught during this period were ten species, including such conspicuous insects as

Metamorpha stelenes L. and *Heliconius charitonius* L., which had apparently not been taken previously, nor recorded subsequently, there. These now bring the total number of species for New Providence Island to fifty-three. Without doubt several more, including resident ones, await discovery. The Lycaenids *Eumaeus atala* Poey and *Strymon limenia* Hew. are probably two such insects, having been recorded from the Bahamas, but without precise location; the Hesperiid *Urbanus dorantes* Stoll has been taken on Andros Island, it is widely distributed from the Argentine to Cuba and would most easily be overlooked and mistaken for the very similar and abundant *U. proteus* L.; the Nymphalid *Eunica tatila* H-Sch. and several other species are common in the neighbouring territories of Hispaniola, Cuba and Southern Florida, and one suspects that they might well occur on New Providence Island.

Of the 53 species of butterfly now known to occur on New Providence Island, 29 (55%) of them have a wide distribution over South and Central America and the West Indies, and range at least as far as Florida or Texas on the North American continent (some are found as far North as Canada); and of these as many as 20 (38%) occur as far South as the Argentine. Eight species (15%) have a more northerly distribution, being confined to the West Indies, Central and North America. A further 7 species (13%) have a yet more restricted range covering the Greater Antilles, Bahamas and Southern Florida. Of the remaining 9 species, 3 are found in the Greater Antilles, Central America and the Bahamas, 4 in the Bahamas and Cuba only, while 2 are endemics.

One feature not indicated in these categories is that only 4 species of the New Providence Island butterflies are found widely over North America but do not occur in South America, though two more, *Vanessa cardui* L. (probably a casual migrant to the Bahamas) and *Eurema nicippe* Cram. have a very limited range in South America. However, the prevailing winds blow from the Bahamas to the Caribbean and the hurricane tracks are from the Bahamas towards Florida or the Gulf of Mexico; this may be a relevant factor. Also, while only two endemic species have been noted, about one third of the Bahamian butterflies have developed endemic subspecies.

In contrast to the apparent abundance of individuals, the number of species is distinctly small considering the Bahama Islands lie astride the Tropic of Cancer and are comparatively near to the Greater Antilles and North American continent. Bates in 1935 listed 156 species of butterflies for Cuba, and in 1925 A. Hall recorded 139 species for Hispaniola, and of these numbers Bates commented that the butterfly fauna of the West Indies was considerably less than one would have expected from large and varied tropical islands.

This paucity is explained largely by the geological history of the Caribbean. The fauna and flora of the Greater Antilles appear to be mainly Central American in origin, and these in turn South American, part having arrived during two widely separated periods by land bridges, the first during the Eocene and the second, of lesser degree, in the Miocene and early Pleistocene. To-day, the respective faunas of Central America and the Greater Antilles exhibit considerable differences resulting from long isolation. At no time does there appear to have been any direct land connection with South America, as for instance along the line of the Lesser Antilles; indeed, these islands themselves have a very limited

fauna.

The Bahama Islands, however, only re-emerged from the sea in the late Pleistocene; the fauna and flora have arrived mainly by wind and ocean current, or by flight in the case of winged creatures; thus there is no relict fauna such as has contributed in large part to that of the Greater Antilles.

With the climate warm throughout the year, many butterflies seem to be continuously brooded, and imagines of some kinds are encountered in all months, but others appear to have definite broods, sometimes but two. The period July to November is wetter than the remainder of the year, so it is not surprising that some insects exhibit seasonal dimorphism; this is most pronounced in some of the Pierids, e.g. *Eurema दौरα* Godt. and *E. messalina* Fab., and to a lesser degree in some Nymphalids, e.g. *Anartia jatrophe* Johannson.

I wish to thank the authorities of the British Museum (Natural History) for permitting me to consult the collections and libraries; in particular, I am greatly indebted to the late Brigadier Evans, Mr. T. G. Howarth and Mr. G. E. Tite for their invaluable assistance in connection with the identification of insects, and Mr. W. T. Stearn for kindly identifying plant specimens.

In the following annotated list of the butterflies of New Providence Island I have stated the geographical range of each species (not subspecies), so far as I have been able to determine it, as this bears some relevance to its habits and presence on the island.

PAPILIONIDAE

1. *Papilio polydamus lucayus* Rths. & Jdn. I found this swallow-tail only along the North coast, the best locality being below Fort Charlotte where they flew about the trees of the sea grape (*Coccolobis uvifera* Jacq.); further West occasional specimens were seen taking nectar from the flowers of the seven year apple. The butterflies varied greatly in size, being from over 4" to less than 3" wing span.
Range: Argentine to U.S.A.
2. *Papilio andraemon bonhotei* Sharpe. This beautiful insect was one of the commonest butterflies, seen frequently feeding at *Bougainvillea* and other flowers in Nassau gardens.
Range: Honduras, Cayman Islands, Jamaica and Cuba.

PIERIDAE

3. *Ascia monuste eubotea* Lat. This migrant was at times common in some fields several miles to the West of Nassau, from which they appeared not to stray. Only two individuals were observed elsewhere. All the ♀♀ caught were of the normal white form, but in the B.M. Coll. are two of this sex of the dark form *phileta* Fab.
Range: Argentine to U.S.A.
4. *Appias drusilla* Cram. Not seen. In the B.M. Coll. is a single specimen, a ♀ of the dry season form *peregrina* Rober.
Range: Argentine to U.S.A.
5. *Phoebis sennae sennae* L. A migrant. This conspicuous yellow species was one of the commonest butterflies on the island; a strong flier but a frequent visitor to flowers.

Range: Argentine to U.S.A.

6. *Phoebis agarithe antilla* Brown. A similar butterfly to the preceding species, but bright orange instead of yellow. It accompanied *P. sennae*, being common, but not as abundant as that species.

Range: Colombia to U.S.A.

7. *Phoebis neleis neleis* Boisd. and *Phoebis statira* Cram. Neither taken. In the B.M. Coll. are four specimens from the Bahamas, one of which is labelled 1.vii.1898 (J. L. Bonhote), Nassau; they have been identified as *P. neleis*. But there are no examples of *P. statira* from the Bahamas in the collection, though Sharpe in 1900 (Proc. Zool. Soc. London) lists this species among J. L. Bonhote's captures. *P. statira* is a migrant ranging from the Argentine to Florida and Texas, it could very easily be overlooked among the numerous *P. sennae*, and can be distinguished from *P. neleis* when examined closely only with difficulty. In contrast to *P. statira*, *P. neleis* has a more restricted range, having been recorded from Haiti and Cuba, in addition to the Bahamas.

8. *Kricogonia lyside* Latr. and *K. castalia* Fab. In 'Insects of Puerto Rico and the Virgin Islands, New York Acad. Sci. 1944, Vol. 12' Comstock distinguishes between two similar West Indian species of *Kricogonia*, which often fly together, *K. lyside* and *K. castalia*. Six of my series of seven caught in August, October and November 1945, would seem without doubt to be *K. lyside*, having the hindwings and tips of forewings underside distinctly greenish and with a definite sheen, though with forewing measurement of only 22mm. to 24mm. The seventh specimen, also taken in October, has the underside of the hindwings and tips of forewings (underside) yellow, and with no sheen; it is a ♂ with forewing measurement of 21mm. and would appear to be *K. castalia*. All these specimens were caught by the North coast road to the East of Nassau, none was seen elsewhere.

Range: West Indies, Central America to U.S.A.

9. *Nathalis iole* Boisd. New record. Local, but several colonies were encountered by the Golf Course and on Oakes Field, in June, November and December, 1945.

Range: West Indies and Central America to the Great Lakes.

10. *Eurema nicippe* Cram. Quite common in one locality, some open fields, to the West of Nassau, where it flew with *A. monuste*. Odd specimens were seen on Oakes Field. I have eight examples taken in November 1945, and can find but two previous records—one taken at Nassau, March 1930 (Rindge; Amer. Mus. Novitates, no. 1563) and one in the B.M. Coll. caught by Bonhote, 24.xii.1901.

Range: Haiti and Central America to Canada.

11. *Eurema messalina blakei* Maynard. This small white *Eurema* was quite common along paths and rides in woodlands. Some degree of seasonal dimorphism is exhibited.

Range: Cuba, Bahamas, Jamaica and Cayman Islands.

12. *Eurema lisa euterpa* Méné. I found this the least common of the *Euremas*. I took specimens in August and from October to December on Oakes Field. There appears to be but one other record, specimens taken November, 1912 (Munroe; Jour. New York Ent. Soc., vol. 58).

Range: Trinidad and Central America to Illinois.

13. *Eurema दौरα* Godt. New record. Flourishing colonies were discovered by the Race Course and Golf Links, and on Oakes Field. My series of fifteen specimens appears identical with specimens from Florida, and exhibits seasonal dimorphism. Thus four are of the wet season form *jucunda* Boisd., caught 16.vi.1945 (2) and 26.vi.1945 (2), the remainder being of the dry season form *दौरα* Latr., caught in January and February, 1946. It is interesting to note that a specimen taken at Exuma Cays, one of the Out Islands of the Bahamas, in January 1953 is mentioned by Rindge (Amer. Mus. Novitates, no. 1715), and is identified as being of the form *ebriola* Poey, a form with the hindwings above being white instead of yellow.
Range: Brazil to U.S.A.
14. *Eurema dina helios* Bates. A common woodland species which flew in company with *E. messalina*.
Range: Central America and West Indies.
15. *Eurema chamberlaini chamberlaini* Butl. A fairly common butterfly frequenting open areas in and around woodland. Nevertheless, very few specimens appear to have been captured, there being but one in the B.M. Coll., and that the type specimen. Two subspecies have evolved in the Out Islands, *inaguae* Munroe on Great Inagua and *mariguanae* Bates on Mariguana Island.
Range: Bahama Islands only.

DANAIDAE

16. *Daraus plexippus plexippus* L. I had anticipated seeing this fine butterfly at Nassau; after eight months had passed I saw a solitary one flying across the air field. Then on December 24th, 1945, I paid a visit to the disused Race Course, and there I saw a dozen or more flying lazily about and visiting flowers, and they were in excellent condition. Here they were to be found for the next six weeks, but none was seen elsewhere.
Range: Argentine to Canada.
17. *Danaus gilippus berenice* Cram. Many small colonies were encountered on Oakes Field and elsewhere to the West of Nassau. However, there is only one previous record, that of a specimen taken March 19th, 1930 (Rindge; Amer. Mus. Novitates, no. 1563). B.M. Coll. — none. My own specimens were all taken in March, April and May.
Range: Argentine to U.S.A.

SATYRIDAE

18. *Calisto herophile apollinaris* Bates. Widespread, but invariably found in small numbers, in bushy places, and frequently noted visiting the flowers of *Bidens pilosa*.
Range: Cuba and Bahama Islands only.
19. *Calisto sibylla* Bates. Not seen. B.M. Coll. — none. This species seems to be known only from the type specimen. However, from its description, it could not be confused with *C. herophile*.
Range: New Providence Island only.

(to be continued)